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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

THE SHADE TREE INSECT SITUATION

IN SOUTHERN CALIFORNIA

by

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U.S. Bureau of Entomology

Palo Alto, California
December 1930

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Present Information

Through correspondence conducted during the past two years, consultation with Entomologist R.S. Woglum of the California Fruit Growers Exchange, Prof. R.W. Doane of Stanford University and Agricultural Commissioner Harold J. Ryan of Los Angeles County, and a two-day field trip made from Santa Barbara to San Bernardino on April 28 and May 2, 1930, we have some preliminary information on the shade tree insect situation in southern California.

The first problem of importance appears to be that of the Monterey cypress, much used as a street, yard and windbreak tree. Reports of dying cypress have come from numerous sources. The bark beetles, Phloeosinus cristatus Lec. and P. cupressi Hopk., the webber, Epinotia subviridis Hein., the tip miners, Argyresthia cupressella Wlsm., A. franciscella Busck and A. trifasciae Braun, and an undetermined sawfly, appear to be the principal insects involved.

Beside the insects, however, there is a serious bark disease which kills many branches and often the entire tree. Forest pathologists believe that this was imported on the Japanese Retinospora and Cryptomeria. It kills a few twigs on these trees, but when it infests the Monterey cypress it goes like pear blight. Some insects, such as the bark miner, Carpocapsa cupressana Kear., may be involved in the spread of the disease. Often, when trees are reported to be dying from insect attack, they are found to be dying from the disease, or a combination of the disease and insects. Any study of the trouble involves close cooperation with a forest pathologist. We have consulted with Prof. McMurphy of the Botany Department of Stanford University and with Mr. W.W. Wagener of the San Francisco office of Forest Pathology of the Department of Agriculture about the disease. Little is known about it, however, and because of lack of funds none of us has been able to give the problem much attention.

Since practically all the reports involved the cypress bark beetle in dying of cypress, we made a special study of the species during the past summer. Not only does the beetle attack and apparently kill some trees, but it attacks and mines the twigs of many others, causing the mined twigs to break over in such numbers that the ornamental value of the tree is seriously impaired.

According to the plan approved last spring, we attempted to:

1. Determine if attacks on the twigs cause attacks on the trunk of the same tree;

2. Determine if beetles from the twigs attack other twigs or attack trunks of trees or sections of felled trees for brood purposes;

3. Determine if the young beetles emerging from infested trees attack the twigs first or attack twigs and trunks of trees indiscriminately;

4. Determine important points in the life history;

5. Determine time of attack on the twigs.

Through a field study conducted on the Stanford Campus and in a few other localities, and a study of bark beetle infestations in cages, we have the following preliminary results:

1. Attacks made on the twigs do not mean that the trunk will be attacked. Practically all varieties of Cupressus, Chamaecyparis, Thuja, Cryptomeria and Retinospora are twig-pruned, but only the Monterey, Arizona and Lawson cypress are killed. Lawson cypress appears to be killed first, then Monterey and Arizona. Italian cypress trees twig-pruned year after year are not attacked in the trunk;

2. Beetles from the twigs do attack other twigs. Apparently the twig-attacking habit is a food one. If a beetle is not disturbed and gets sufficient food from one twig, it goes directly to the trunk of a suitable living tree, a weakened tree, or to a section of a felled tree, and starts its brood gallery. If it does not attack a suitable twig the first time, or is disturbed, it will go from twig to twig until satisfied;

3. The young beetles emerging from infested trees appear to go to the twigs first if there are any twigs. If not, they will enter the bark, but do not form normal brood galleries. Beetles from the twigs enter the bark and form normal brood galleries; apparently the twig-pruning habit is a normal one, usually indulged in, but not absolutely necessary;

4. The main brood of the cypress bark beetle overwinters as a full-grown larva in a pupal cell in the outer wood. There are some straggling broods of younger larvae, however, and some beetles in the twigs. Pupation and transformation to the adult take place in the spring. Practically all the beetles are out by the first of July. Attacks on the trees soon start, and part of the new brood resulting from this attack completes development and emerges about the first of October. Some of it, however, winters over in the larval stage. The part that emerges attacks the twigs and finally the twigs trunks of new trees. There is thus one annual generation and part of a second;

5. Beetles attack the twigs and cause twig pruning every month in the year.

Numerous reports were received during the past season of damage to cypress foliage by a caterpillar which made a webby trail through the foliage. This was reared from material sent in from Downey, San Mateo, San Francisco and Palo Alto. The species was identified by Heinrich as Epinotia subviridis Hein.

Damage to cypress foliage, consisting of small patches of red twigs, was also reported from numerous localities. Material was collected and three species of Argyresthia reared. These were identified by Busck as A. cupressella Wlsm., A. trifasciae Braun and A. franciscella Busck. Some differences in life history and larval stages were noted.

During the season of 1930, damage to the foliage of cypress by an unknown sawfly was reported from southern California for the first time. County Agricultural Commissioner Ryan reported damage in Los Angeles County, and the writer collected specimens in Pasadena and near Rialto, San Bernardino County. Later one heavy infestation was investigated near Los Altos, Santa Clara County. This last was controlled by spraying with arsenate of lead, ten pounds to 150 gallons of water.

The second shade tree insect problem in southern California is that of the native live oak on home sites and recreational areas. The oak twig girdler, Agrilus angelicus Horn, appears to be the most important enemy, but at intervals the trees are defoliated by the California oak worm, Phryganidia californica Pack. The carpenter worm, Prionoxystus robiniae (Peck), and the western oak bark beetle, Pseudopityophthorus pubipennis (Lec.), also cause serious damage at times. We have published a farmers' bulletin on the oak worm and articles in the Journal of Economic Entomology on the twig girdleraand carpenter worm.

Two other shade tree insect problems of southern California andwhich we have had correspondence or reports are those of the Aegeriid, Aegeria mellinipennis (Bdv.), attacking the trunks of oak and mature sycamore, and the alder bark beetle, which defoliates the native alder and makes a general nuisance of itself on summer home sites and recreational areas.

Information Desired

Representative areas in southern California should be examined to see if bark beetles or other insects are killing cypress trees. In northern California much of the killing has been caused by the bark disease. We do know, however, that the beetles can and often do kill parts or entire trees. This may be when the vigor of the tree is at a low ebb from drought or other reasons. Practically every tree gets into such a condition some time during its life, however, and is susceptible to attack. Numerous trees which have part of the bark killed by beetles--sometimes as much as one side of the trunk--recover and live for as much as twenty years afterward.

For valuable trees, such as those used for ornamental, shade or windbreak purposes, we ought to develop some intensive methods of control. At the present time all we can do is to recommend that living trees be kept in vigorous condition by cultivation, fertilization and irrigation, and that infested ones be felled and burned to destroy the infesting broods. The first does not seem to do much good when the

beetle becomes epidemic, and the second is not of much use unless the entire community acts promptly. Bordeaux sprays appear to have acted as repellents against the fruit tree bark beetle in the Santa Clara Valley. Sodium fluosilicate dusts applied to the bark of the trunks and larger branches of the cypress trees at the proper time might kill the bark beetles and prevent attack. These and other methods of control should be tried in the field.